Movement in Architecture: Disciplining the Digital Diagram

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ABSTRACT

The digital processing of three-dimensional movement data often leads to instrumental design methods. This problem-solution design paradigm limits spatial design practices because they do more than solve singular problems. The question is whether spatial design practice can exploit the mediating effects of hardware and software. Robin Evans’ essay “Translations from Drawing to Building” argues that architecture needs to embrace the mediating effects of the drawing. To this end digital motion capture systems open numerous new mapping and diagramming techniques. The unique condition sponsored by movement data is that architecture must find new ways of drawing the relationship between drawing, data and experience. These new drawings also open numerous issues around the representational and formal opportunities raised by movement capture technologies. Accordingly, the architectural exploration of movement data needs to assess the basis by which all design disciplines can approach movement data through generative rather than instrumental design acts.

KEYWORDS

Architecture, Context, Data, Digital Diagramming, Mapping, Motion Data, Scale

INTRODUCTION

The precision of motion capture technology offers spatial designers a vital new tool to map space according to “what the body knows” (ABC, 2014). This technology promises to furnish hard data by which to record and analyze the ‘affect’ of space on the body. Moreover, the interpolation and extrapolation of this data provides valuable information to design for the body. Therefore, the capacity to collect, represent and project hard data recasts ‘embodied knowledge’ as a quantifiable, performance-based experiential epistemology.

Experience-based architectural design paradigms aim to counter the perceived formal limitations of semiotic-based design practices. The criticism of semiotics is that it undertakes an intellectual mediation of experience that pre-determines how the body ‘speaks’ to space. However, contemporary experiential ontologies confront the same problems the replication of knowledge posed for phenomenology. Replication formalizes knowledge, and this process of formalization uses modes of communication. After McLuhan (1995) communication always problematizes experiential thinking because it is always mediated. Communication makes experience inseparable from the medium. Replication also problematic for experiential spatial practices because design is projective. Design initiates procedural mechanisms and forms that communicate through three moments of representational mediation. Design not only demands a description of knowledge, but it also requires knowledge to be gathered, recorded and processed. Therefore, the projective logics of production open an array of translational slippages in the procedural movement from ideation to form.
Robin Evans’ (1997) essay ‘Translations from Drawing to Building’ examines architectural drawing practice to tackle the issues around projective representation. Architecture is uniquely placed to interrogate this matter because the mediation of objects occurs through scaled modes of representation (Evans, 1997). This scalar intercession in the form-making process makes architecture, of all design disciplines, more susceptible to its representational mediums. The motion capture suite would appear to solve the problem of scalar mediation because the data operates at a one-to-one scale. To this end, the architectural application of this data promotes strategies of multiplication and aggregation over amplification, given that the latter magnifies and shifts the scale of the data. However, the mediation of data and ontological formalization of knowledge suggests that motion capture data cannot escape the problems of communication. Any experiential account of architecture, obtained via the motion capture suite, cannot avoid the translational moments in the capture, mapping and formal translation of the data. The technological limits of communication return to thwart the notion that the motion capture technologies enable an ‘authentic’ response to embodied experience. The medium continues to question the data’s provenance, meaning the system cannot present the body as an ‘authentic’ site of experiential knowledge.

In the 1990’s, architect, Greg Lynn, developed a new type of architectural diagram. Using animation software, Lynn began to generate form through the quantitative translation of contextual data. Like the map, the issue of scale was directly addressed by the medium because of the axiomatic processing of form. The retention of the data’s scalar integrity did more than collapse the previous disciplinary distinctions made between maps from diagrams. It also provided a new type of architectural drawing that could process contextual data to scale. The legitimization of architectural objects now occurs through performative logics. In effect, the validation of objects occurs by measuring them against the data sponsoring their development.

The scalar specificity of movement data and the scaled aspect of the generative diagram establishes a sound basis for exchange between motion capture technologies and architectural drawing practice. This paper, drawing on extensive research into the computational reconfiguration of motion data, examines the issues motion capture technology and the generative diagram poses for each other. The investigation will explore these issues through a critique of motion capture technology and a comparative analysis of the generative diagrams developed by architects Greg Lynn, NOX and dECOI. The critique and analysis will examine how scale disciplines motion capture technology and the generative diagram to better understand the way in which digital mediums can offer productive and performative, rather than instrumental, translational slippages. Ultimately, this examination aims to understand how the generative diagram can engage in a representational play that simultaneously avoids the fallacy of processing authentic experiential facts and the predetermination of form found in semiotic design paradigms.

THE CREATIVE LIMITS TO MAPPING MOVEMENT

The obvious advantage digital motion capture systems have over Étienne-Jules Marey and Eadweard Muybridge photographic studies is that they provide a three-dimensional portrayal of the moving body. It is understandable that this more detailed information tends to instrumentalize the data. While the body is indivisible from how it moves, the precision of the captured encourages the use of movement data for problem-solving. The problem with a problem-solution design paradigm is that it tends to objectify the body as a ‘thing.’ The body’s objectification begins once the data’s precision conceptually recasts the body as a source of information. This intellectual movement, often seen in animation and biomedicine, values movement data because it is used to establish how the body should move. The problem varies between disciplines. For instance, animation wants to re-present the body while biomedicine aims to enhance it. However, the body becomes an object to be investigated irrespective of whether it is ideal or delinquent. The objectification of the body also occurs whenever inductive reasoning is used to interpolate or extrapolate unique data sets into standardized or idealized
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